New York State Integrated Pest Management Program

Final report
1999 New York State IPM Grants Program
Research and Development Proposal

Title: Development of Integrated Pest Management Strategies for Apple Fruit Russet.

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Abstract:

This research was initiated in 1996 when we discovered that the common fungi, Aureobasidium pullulans and Rhodotorula glutinis, which commonly live on apple surfaces, are able to cause russet. We currently feel that these microbial causes of russet are important on several apple cultivars. Our goals have been to study the biology of these fungi, determine under what conditions they cause russet and identify commercially and environmentally sound methods for control.

It is realized that different fruit cultivars vary in the degree of russet they typically sustain, however detailed information concerning present problem cultivars in New York and how growers manage the problem was not available. To accomplish this goal, we formulated surveys that have been sent to 579 NY growers, processors and consultants. They are currently being returned (more that 120 at this time) and will provide information about cultivar susceptibility, potential management methods and the potential economic impact of this disorder. Because russeted fruit can be down-graded by processors resulting in significant economic losses to growers, efficient management is warranted.

Natural populations of the russet-causing fungi were measured on fruit in 1999. This will provide information as to when populations are greatest during the growing season and what effect temperature, rainfall and relative humidity have on them. We plan to develop an efficient management program with information collected on cultivar susceptibility, relative susceptibility of fruit as they develop and the effectiveness of sprays for russet control.

We determined a few years ago that the russet fungi involved are sensitive to certain fungicides and not to others. For example, captan is active against these fungi and generally reduces russet severity. In contrast, the sterol-inhibitor fungicides seem to have little or no effect. In 1999 we tested previously effective fungicides such as captan and compared them to newer fungicides and other chemicals. One outcome was that captan did not work in every experiment. A possible explanation for this was found in related research funded by the NY Apple Growers Association. It was discovered that captan will significantly reduce the fungi over a 7 day period, however its effectiveness appears to be related to the amount of rainfall during that period. Even with little rainfall the natural populations of the fungi recover to "normal" levels seven days after the captan application. We have learned that we are working with ubiquitous fungi and variables such as spray coverage, chemical effectiveness and rainfall are all likely to impact the effectiveness of control. Other fungicides belonging to the strobilurin group and a quaternary ammonium compound show promise as russet controls but are in need additional testing.

Our overall goal is to reduce fungicide inputs where possible and to control russet with a biology-based management system. Thus far we have educated growers about microbial causes of russet and have demonstrated that some controls are more effective than others. This has already impacted management decisions. However, we realize that additional research is essential to more precisely identify periods and conditions when control applications are necessary.

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